Chapter 5
Development of an Integrated Conceptual Site Model for OE and HTRW Projects

5-1. Introduction

a. This chapter describes the steps in CSM development for properties whose historical military use creates a potential for OE and HTRW that may require assessment and response. When the potential for OE and HTRW exists on a site, then an integrated CSM should be developed. An integrated CSM addresses all source–receptor interactions for both OE and HTRW from all sources at a site. Typically, the HTRW project will follow the OE project phase. In such cases, data needs for the HTRW project must be communicated early on to ensure that OE project efforts support those needs when possible. As noted in Paragraph 2-3, the PM should assemble a team to address both OE and HTRW issues, and oversee the integration of overlapping data needs. An integrated CSM will facilitate concurrent OE and HTRW data collection.

Early and ongoing **coordination** between OE and HTRW personnel is critical to efficient planning and execution of an integrated project. Ideally, during the early stages of the project, OE personnel will coordinate with the HTRW team members to ensure data collected will meet their DQOs.

b. The overall approach to developing the CSM is the same for an integrated project as for an OE site and an HTRW site: profile information is collected and pathways are subsequently analyzed. CSM development is a tool in the TPP process. The team must collect and analyze existing profile information, prepare an initial CSM, develop project DQOs for that phase of the project, and collect necessary data specific to fulfilling those objectives.

5-2. Profile Information Resources

OE and HTRW project phases have distinct information needs and some that are common to both. The information needs described in the following sections represent some areas where OE and HTRW data needs may overlap. These summaries are not specific to any project or site, but provide a general guide to information needs that may be shared by the team members. Profile information resources for OE and HTRW sites described in previous chapters will be used, and need to be shared by all team members.

5-3. Facility Profiles

a. Facility Profiles provide information to help determine the source areas at a site. When both OE and HTRW may be present, the team needs to gather and sort facility profile information that supports both OE and HTRW projects.

b. A primary information need common to CSM development for OE and HTRW projects is delineation of the OE use areas, OE area type, and the type and distribution of OE in each area. Many OE areas have the potential not only for OE, but also explosives constituents that may result in environmental contamination. Explosives and propellants from low-order detonations or

prolonged use of an area have been shown to affect soil, sediment, and ground water media at some locations.

c. For example, investigation at an artillery range would typically be started as an OE project. The team would, in the course of their investigation, define the range boundaries of this OE use area to focus their investigation. They may divide the range based on known or anticipated density of ordnance fired at the target area over the years (Figure 5-1). This information would be critical to an HTRW CSM as well, allowing that project phase to focus investigations in those areas most likely to be a source of subsurface chemical contamination from the OE constituents (Figure 5-2).

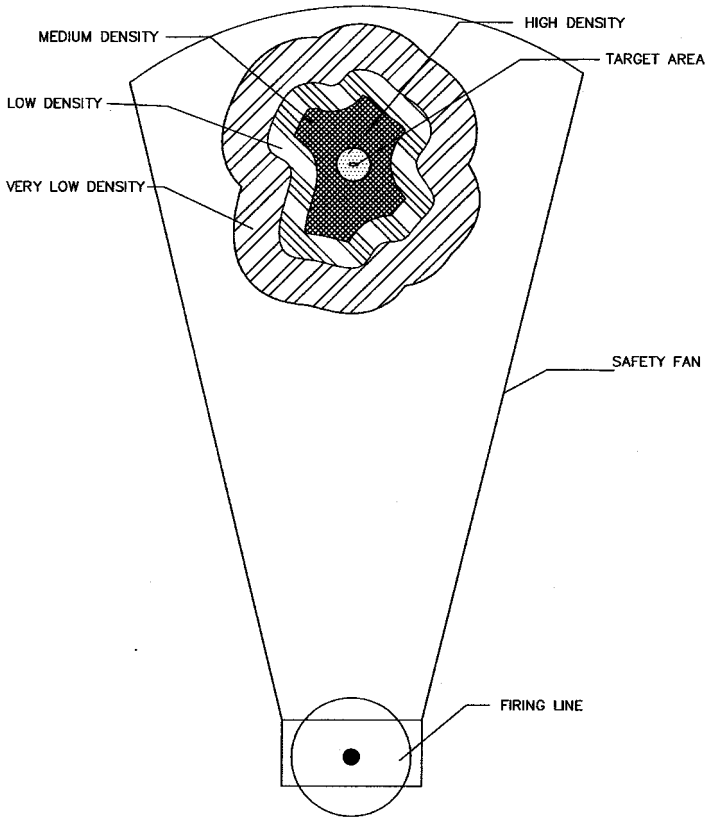

Figure 5-1. Density Distribution of Projected Ordnance

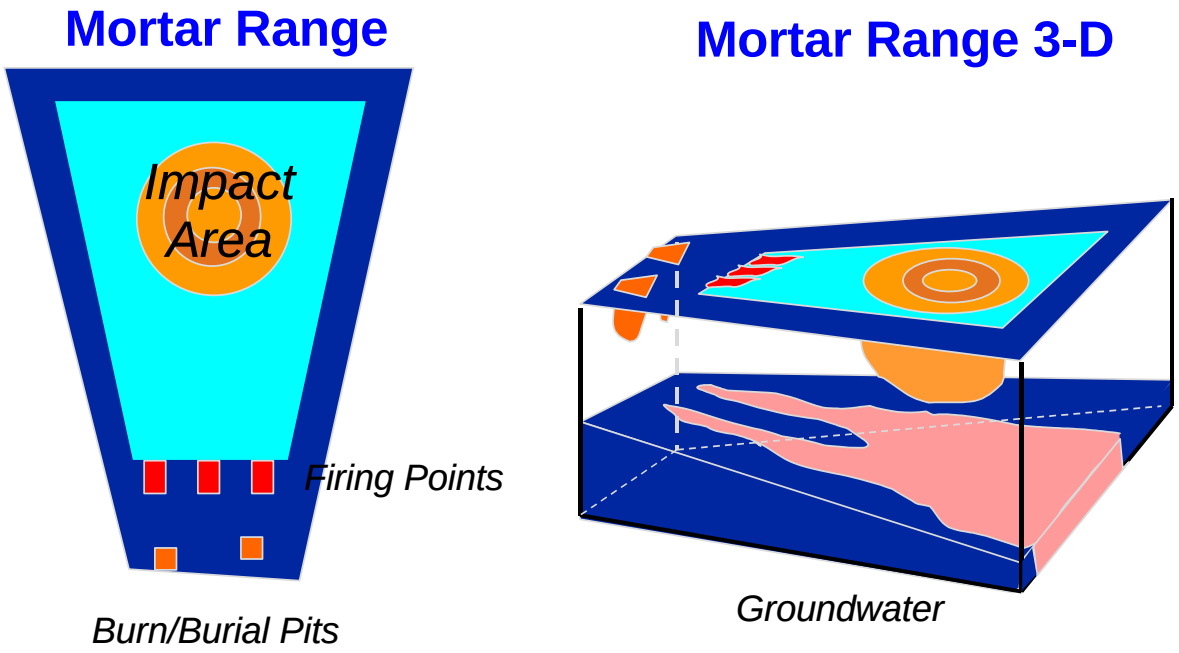

Figure 5-2. Areas of Potential OE and HTRW Distribution at a Mortar Range

d. Many locations with OE also have a potential for chemical contamination. For example, open burn (OB) units often used fuels as accelerants when excess ordnance is destroyed. Similarly, the manufacture of explosives at ammunition plants generated large quantities of waste rinse water that was retained in impoundments and often releases contaminants to other media.

e. The type of OE used at a site is an important information need for an integrated project. This information is critical to understanding the explosive hazards and the possible chemical contamination resulting from OE constituents. All team members will need to work together to identify explosives and propellants by their precise composition. Changes in the chemical composition of constituents occur over time and from exposure to the environment. Explosive D (ammonium picrate), for instance, degrades to picric acid and other constituents when exposed to moisture, and can produce explosive picric salts that are extremely shock sensitive.

5-4. Physical Profiles

OE and HTRW projects can share most physical profile information. Site topography, geology, meteorology, and hydrology data are examples of common data needs. Soil type and soil properties (moisture content, corrosivity, pH, etc.) are important for evaluation of depth of OE and the fate and transport of chemical contamination. The same type of OE use area in a different physical setting will present different environmental challenges. Because physical profiles also affect access to OE, this information must be clearly presented.

5-5. Release Profiles

Release mechanisms include those natural processes or human activities that relocate OE or introduce and distribute an HTRW contaminant in the environment. For HTRW, this often leads to migration from the source area to another exposure medium.

5-6. Land Use and Exposure Profiles

Land use and receptor information is common to both OE and HTRW projects. The team must consider both current and reasonably anticipated future land use so that all source–receptor interactions can be evaluated. Although the source–receptor interactions may differ, understanding receptor populations and their activities is necessary for either investigation.

5-7. Ecological Profiles

The Ecological Profile will identify surrounding land and habitats and will aid the team in determining potential ecological receptors. Special use areas (e.g., fisheries) as well as protected species potentially impacted by the site should be described.

5-8. Pathway Analysis

The Pathway Analysis for an integrated site will allow the team to identify all source–receptor interactions for both the OE and the HTRW components of the project. Analyzing exposure pathways for OE or HTRW projects requires linking a source to a receptor, although the interactions differ. All complete exposure pathways will be illustrated in the integrated CSM. Figure 5-2 presents an example integrated CSM for an OB/open detonation (OD) area (the generation of this integrated CSM is explained in Appendix D).

a. Source. All sources can be identified by analysis of the Facility, Physical, and Release Profiles. The team needs to be aware that many types of OE use areas can provide a source of HTRW, and ensure that the integrated CSM evaluates these sources. Common sources must be dealt with in an integrated way, and will become part of an integrated CSM.

b. Interaction. Information from all profiles will assist in identifying source–receptor interactions. Analysis of the interactions for an integrated CSM consists of separate evaluations for the OE and the HTRW component. For either component, the interaction has elements that must be present for the pathway to be complete. Those interactions forming complete pathways will be shown in the integrated CSM.

c. Receptors. Receptors are identified from the Land Use and Exposure Profile, as well as the Ecological Profile. The evaluation of receptors must take into account current and future land use. Site restrictions for OE may also limit or alter the receptors evaluated for the HTRW component. The team needs to consider all receptors with the potential for exposure to sources at the site.

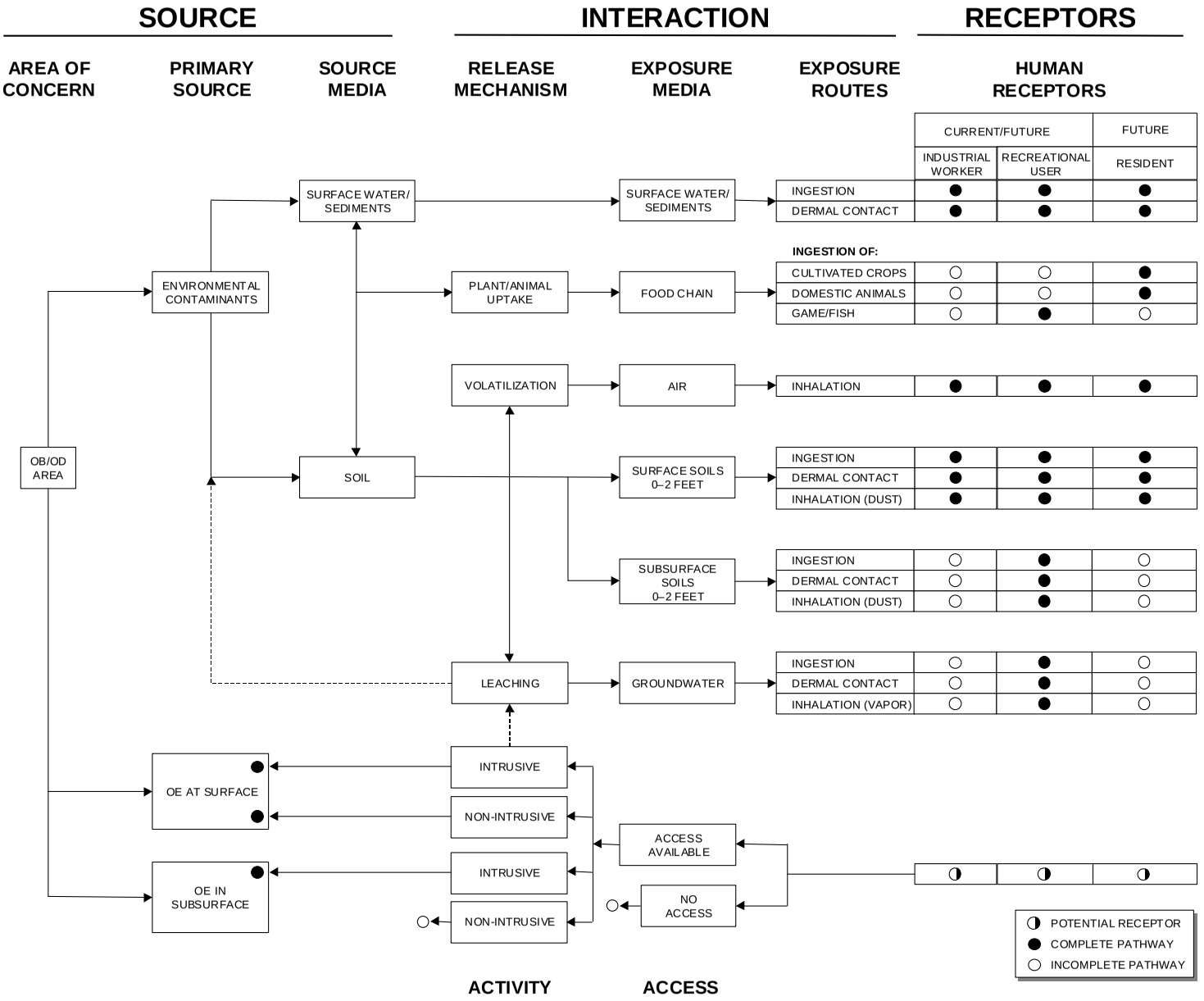

Figure 5-2. Example Integrated CSM for an OB/OD Area